



Upper Hudson River Sediment Transport Model

Topic 2: Evaluating Predictive Capability → Current Model

December 7, 2010

Sediment Transport Model Calibration

- Used TSS concentration data collected during 1994 spring flood (March 31 - April 29)
 - Main channel
 - Tributaries : SK, MK, BK, HS
- Calibration metrics
 - TSS concentration
 - Sediment mass balance

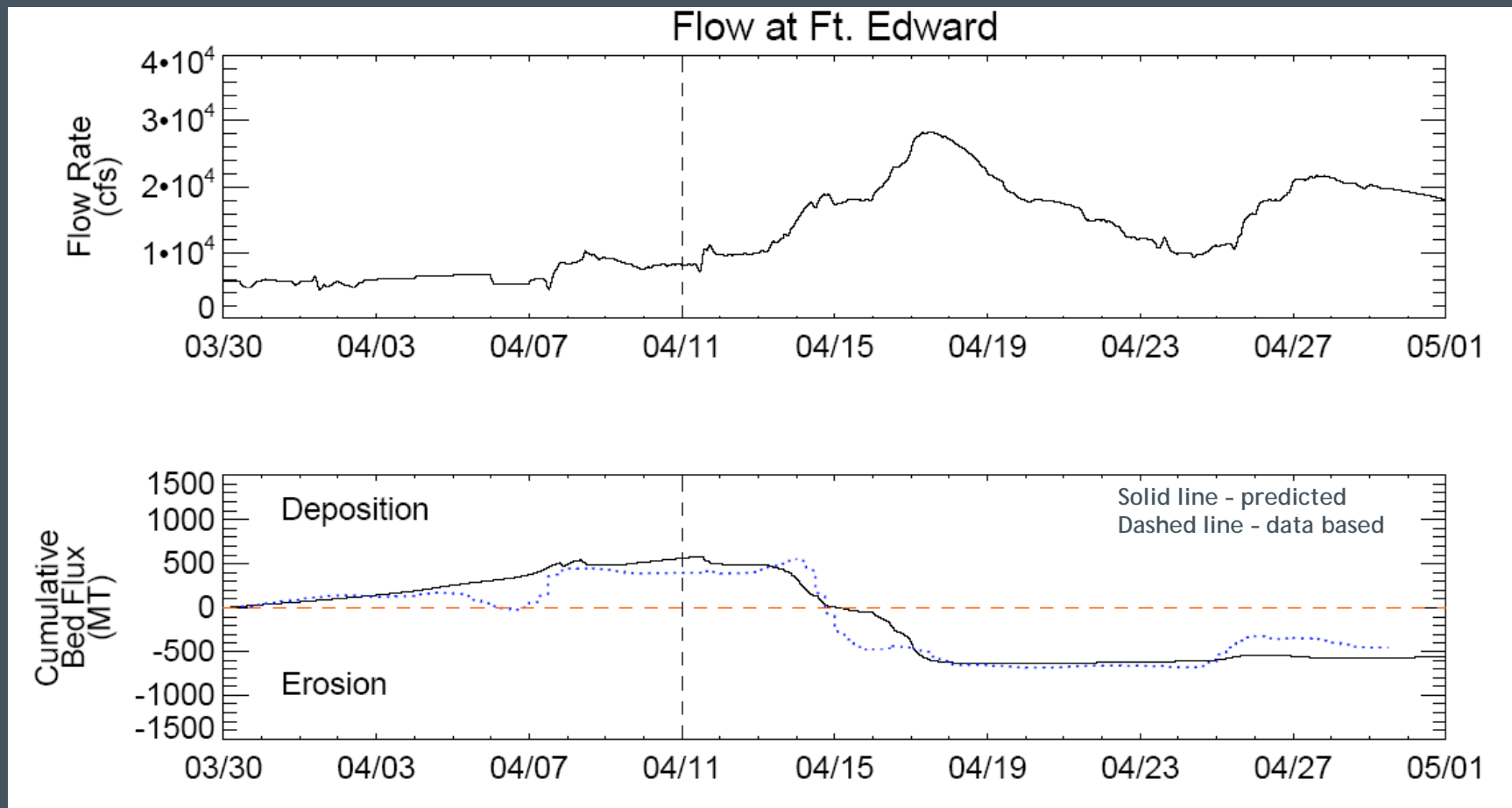
Data-Based Mass Balance

- Estimated incoming sediment load from upstream and tributaries: L_{in}
- Estimated outgoing sediment load at TID: L_{out}
- A complete mass balance:

$$\begin{aligned} L_{in} - L_{out} &= \Delta M_{wc} && \text{change in total suspended sediment mass} \\ &+ M_{dep} && \text{depositional mass} \\ &- M_{res} && \text{resuspension mass} \end{aligned}$$

- Predicted ΔM_{wc} is ~ 5% of predicted $(L_{in} - L_{out}) \rightarrow$ neglected this component of mass balance
- Final mass balance: $L_{in} - L_{out} = M_{dep} - M_{res}$

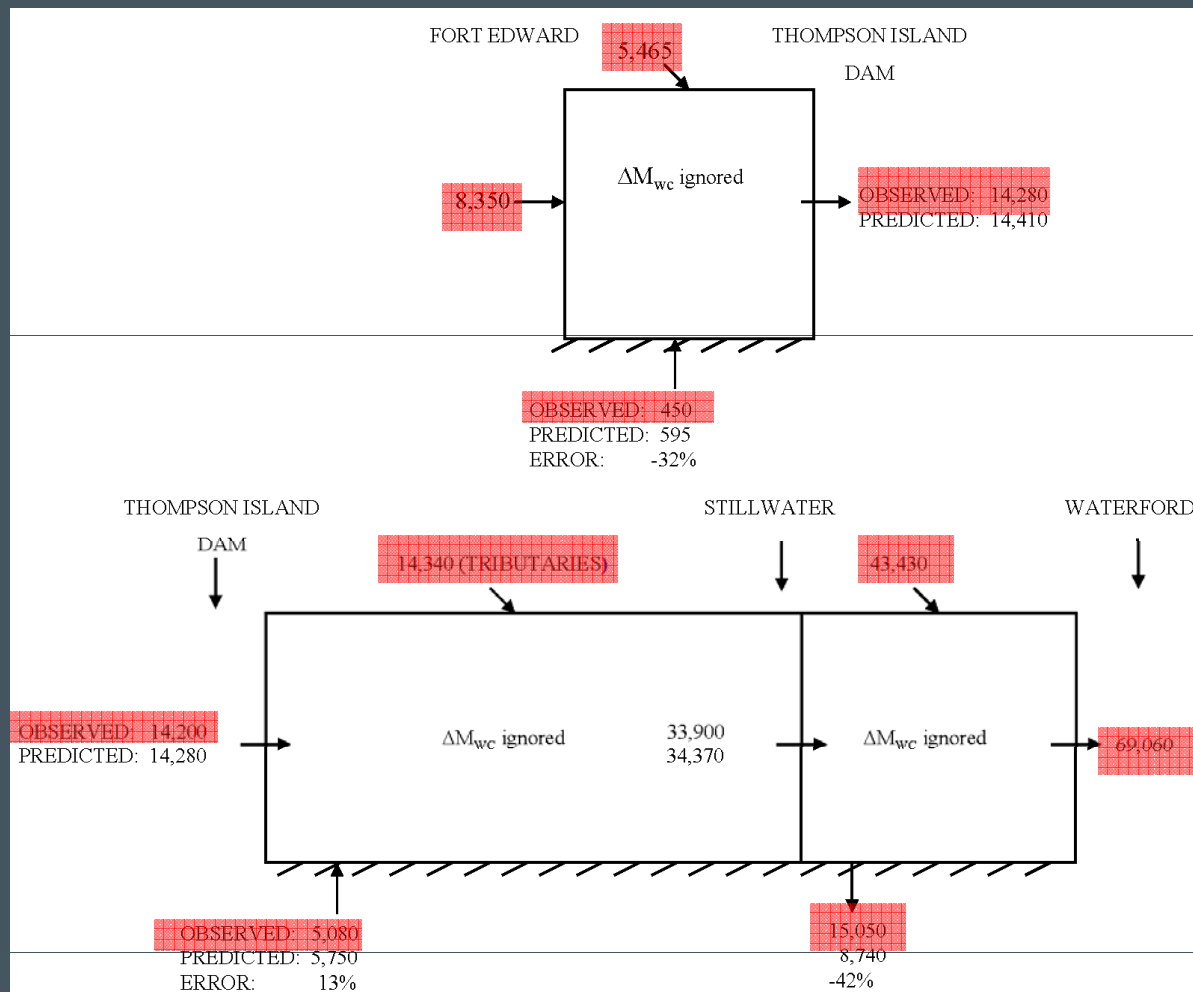
Sediment Transport Model Calibration: 1994 Flood, Reach 8



March 30 - April 29, 1994

Sediment Transport Model Calibration:

1994 Flood, Reaches 1 to 8, Sediment Mass Balances

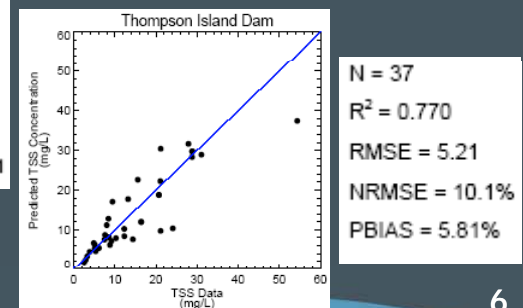
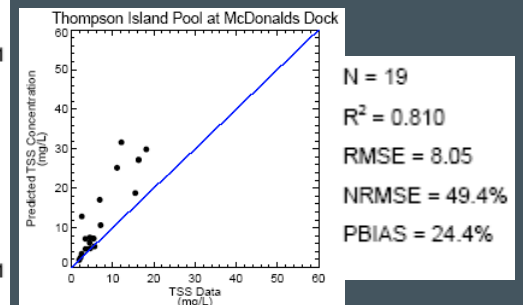
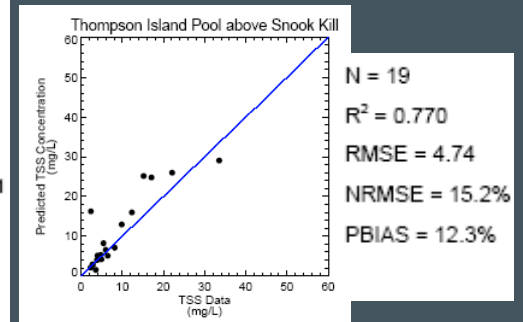
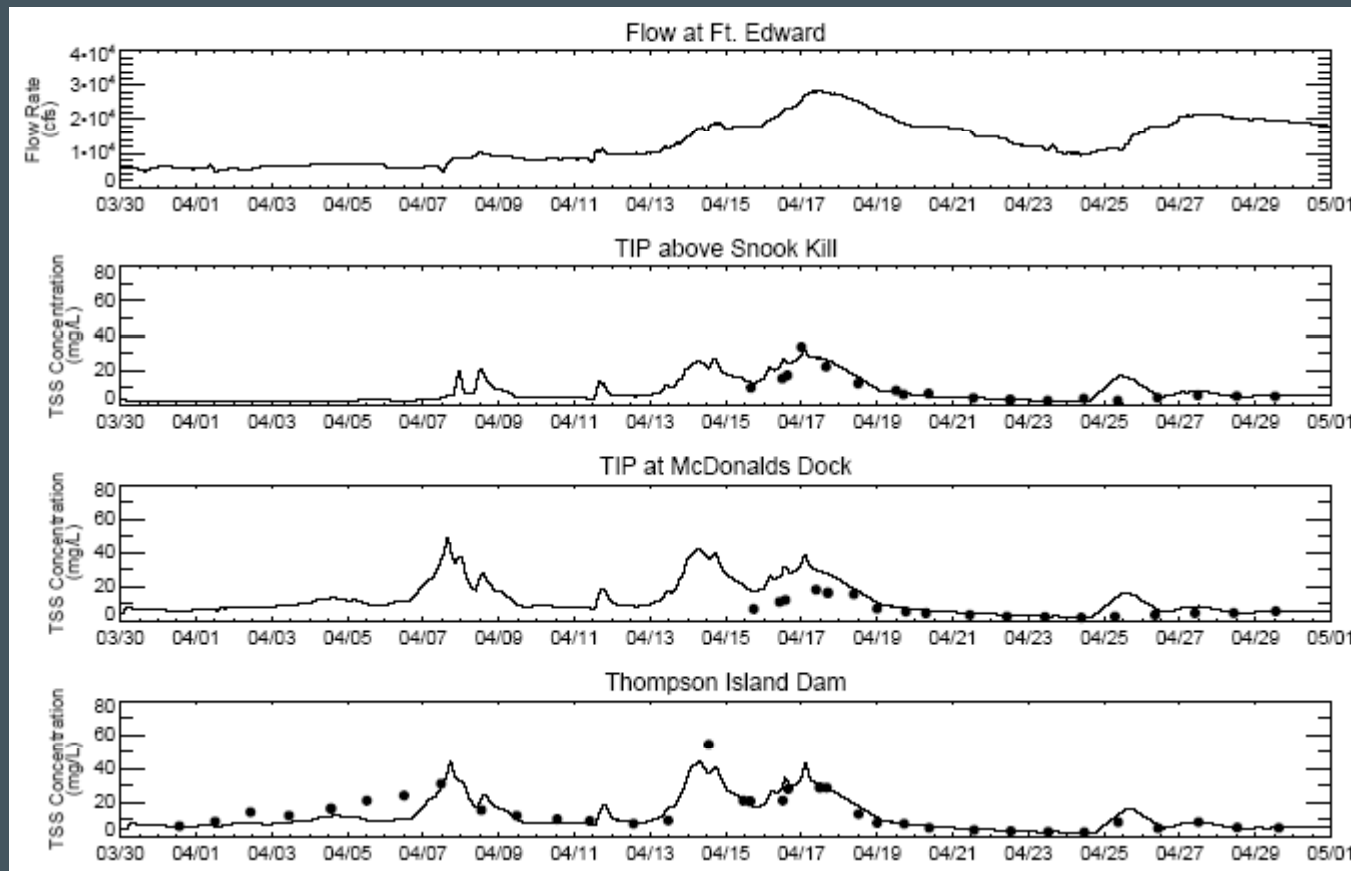


March 30 - April 29, 1994

March 31 - April 29, 1994

Sediment Transport Model Calibration

1994 Flood, Reach 8, TSS Concentration Data

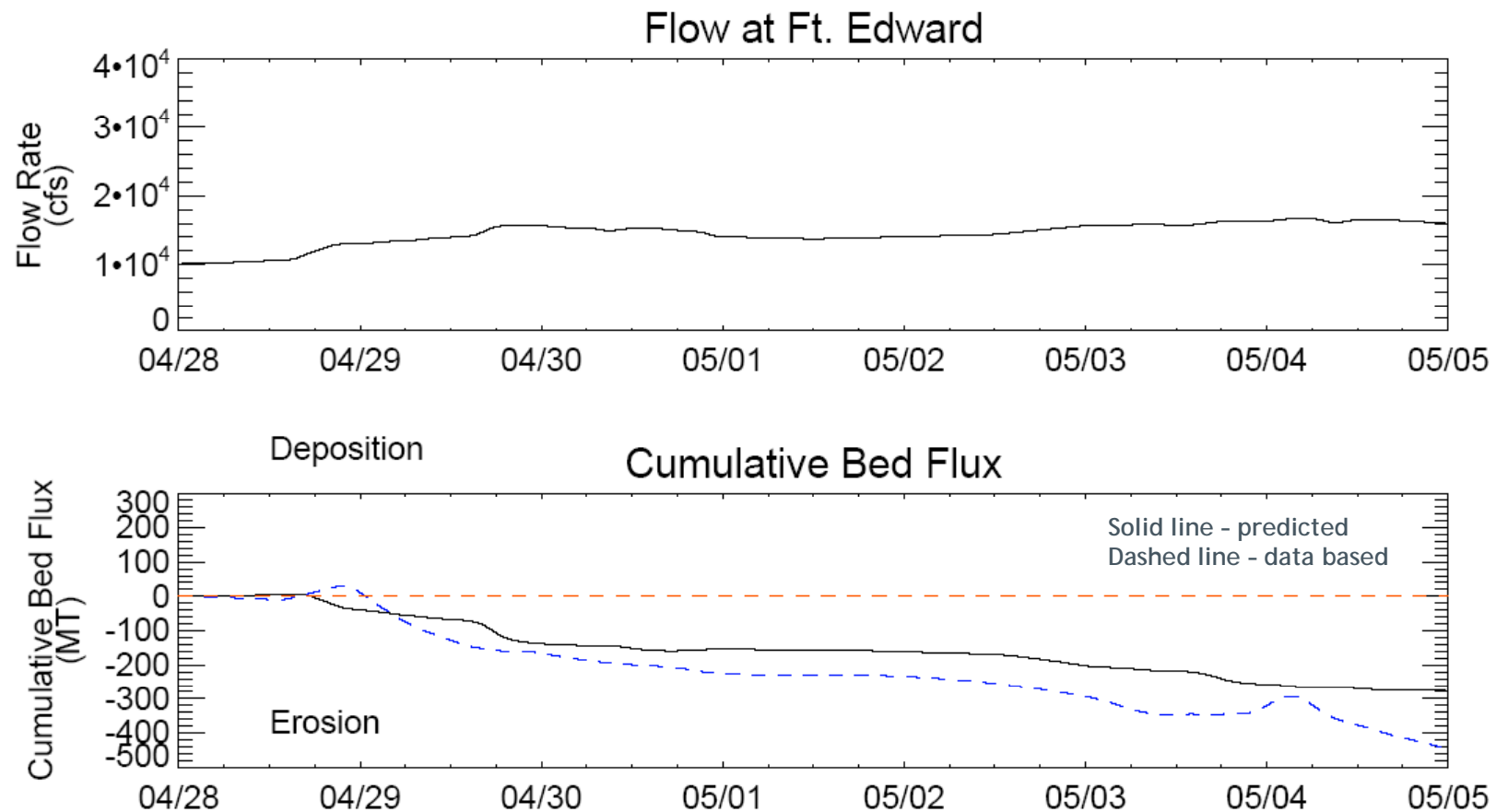


March 30 - April 29, 1994

Sediment Transport Model Validation

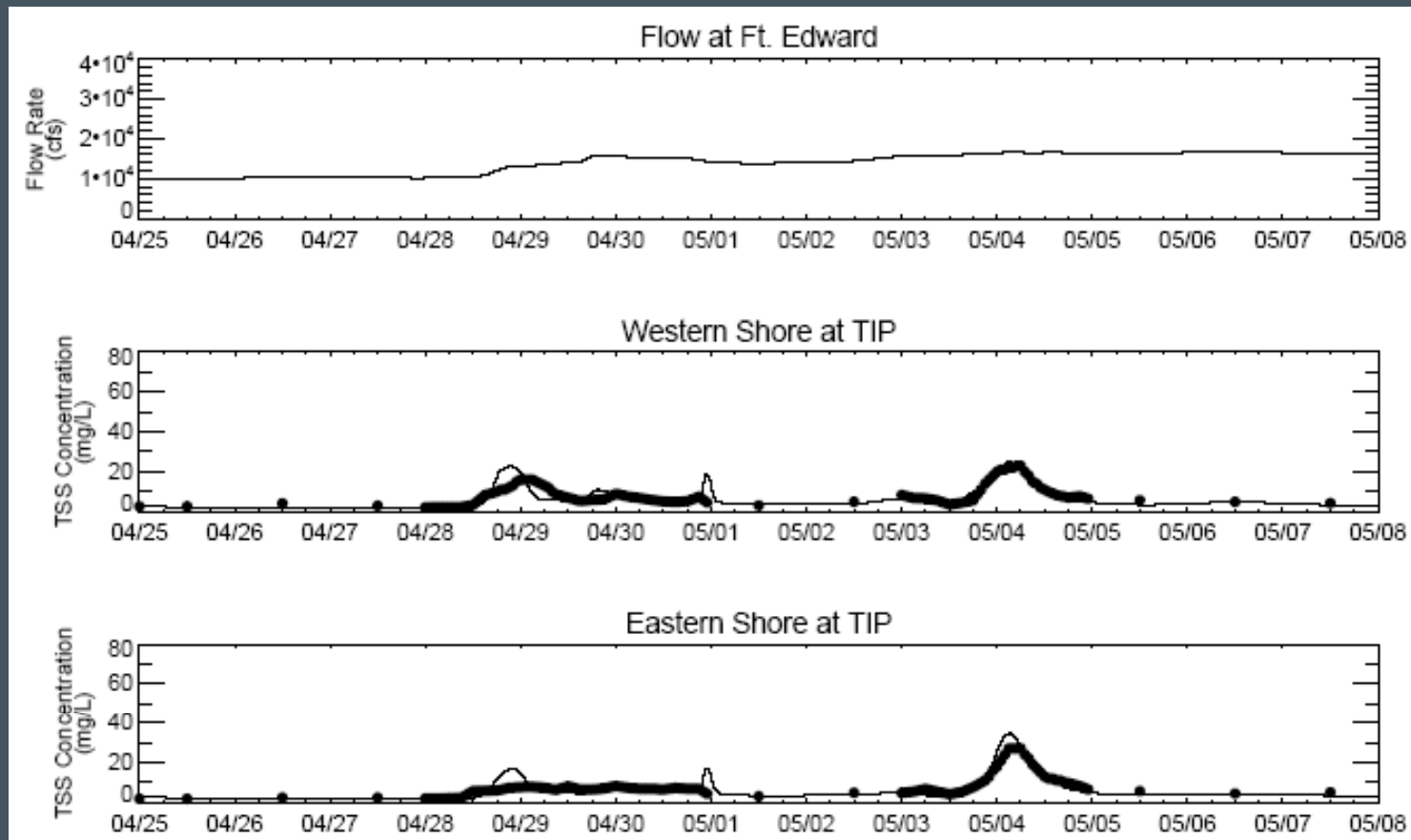
- Used data collected during spring floods in 1993 and 1997
 - TSS concentrations
 - Sediment mass balances
- Initial bed conditions were specified using long-term simulation results
- No adjustment of model parameters during validation simulations

Sediment Transport Model Validation: 1997 Flood, Reach 8



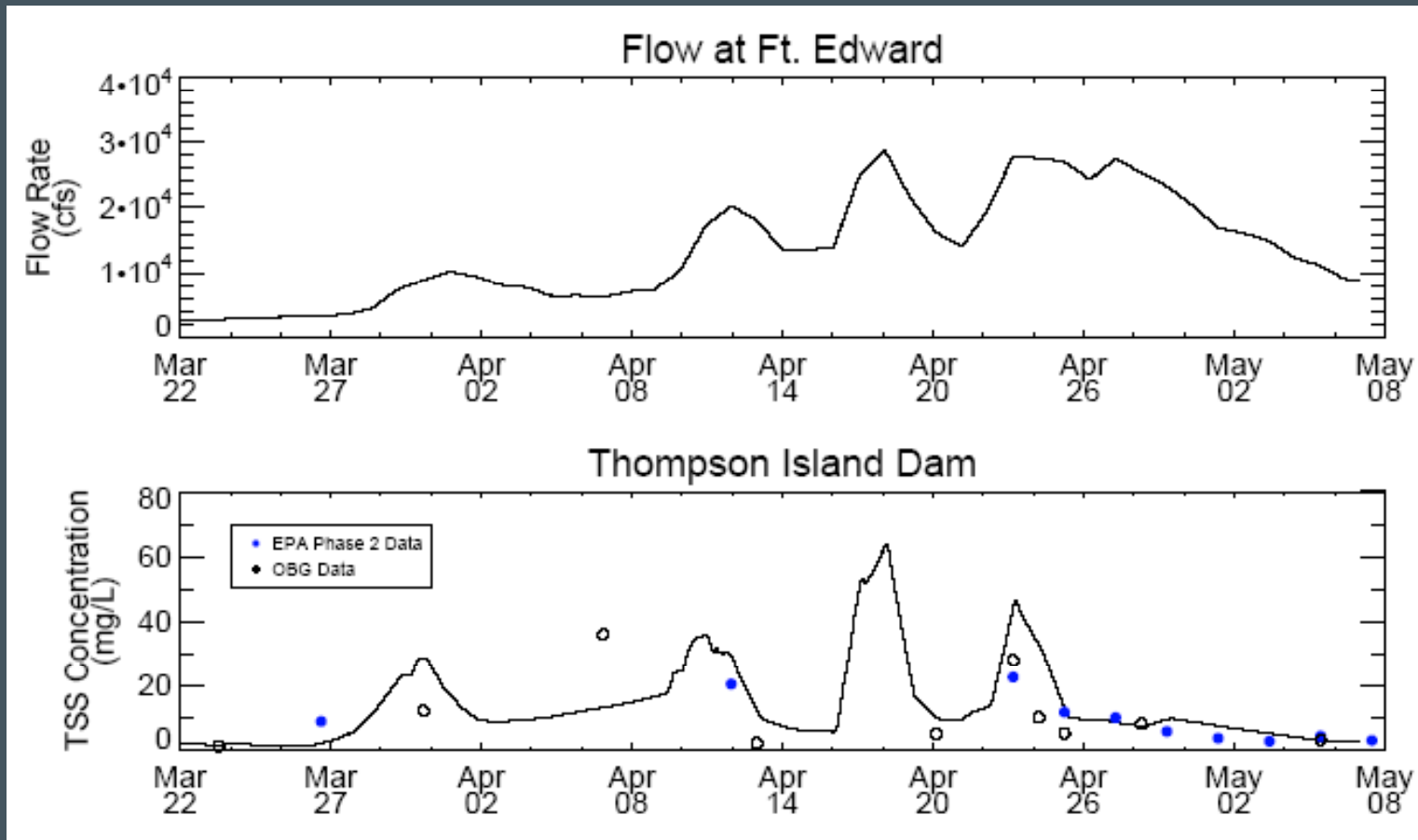
April 28 - May 4, 1997

Sediment Transport Model Validation: 1997 Flood, Reach 8, TSS Concentration Data



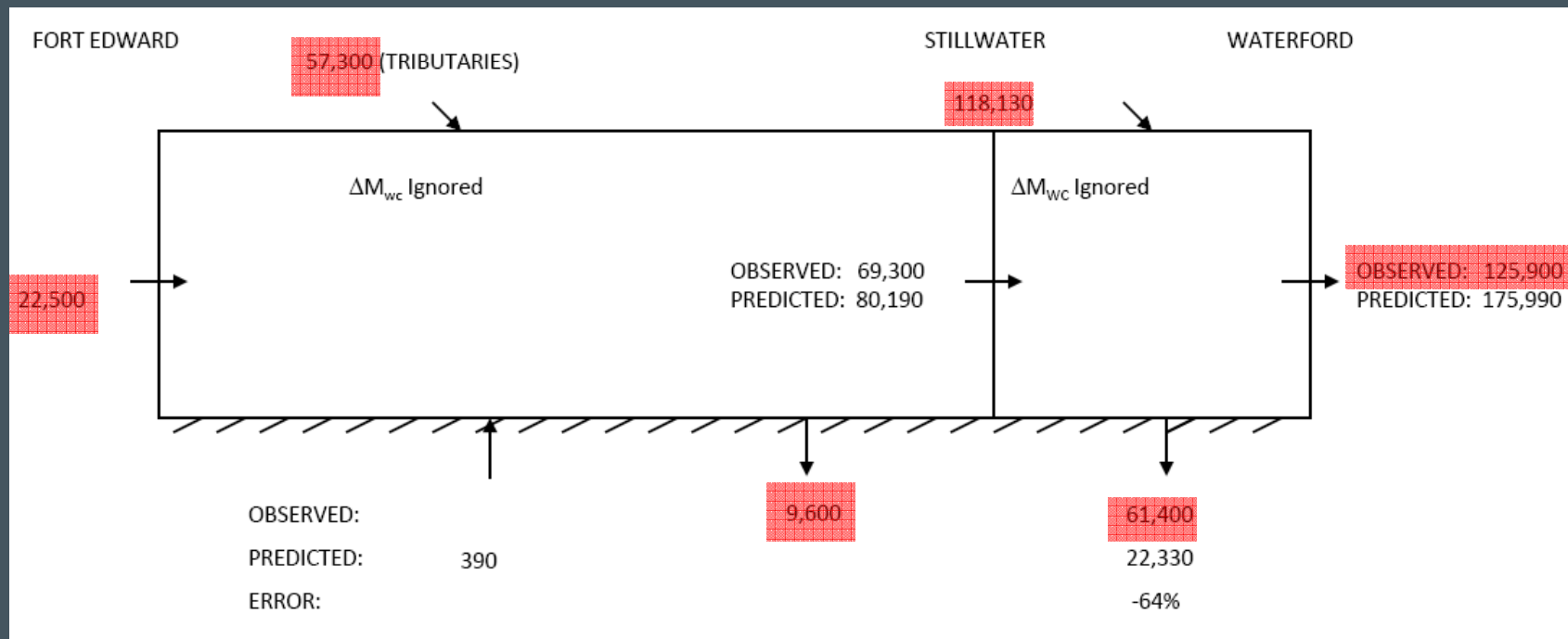
April 25 - May 7, 1997

Sediment Transport Model Validation: 1993 Flood, Reach 8, TSS Concentration Data



March 22- May 7, 1993

Sediment Transport Model Calibration: 1993 Flood, Reaches 1 to 8, Sediment Mass Balance



March 24 - May 4, 1993

Net Sedimentation Rate Data

